

REMARKS/ARGUMENTS

Favorable consideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-14 are pending in the application, with Claims 1, 3, 12 and 13 amended by the present amendment.

In the outstanding Office Action, Claim 2 was objected to; Claims 1-4 and 10-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Atarius et al. (U.S. Patent No. 6,606,363, hereinafter Atarius) in view of Kobayashi et al. (U.S. Patent No. 5,751,703, hereinafter Kobayashi) further in view of Takeuchi (U.S. Patent No. 6,408,038); Claims 5 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Atarius in view of Kobayashi further in view of Takeuchi and Brardjanian et al. (U.S. Patent No. 6,590,945, hereinafter Brardjanian); Claims 6 and 8-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Atarius in view of Kobayashi further in view of Takeuchi and Naden et al. (U.S. Patent No. 5,999,561, hereinafter Naden); Claims 12-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Muto (U.S. Patent No. 5,630,218) in view of Kobayashi further in view of Takeuchi and Atarius; and Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Muto in view of Kobayashi further in view of Takeuchi, Atarius and Kumagai et al. (U.S. Patent No. 5,548,811, hereinafter Kumagai).

Claims 1, 3, 12 and 13 are amended for cosmetic purposes and to correct antecedent basis informalities. No new matter is added.

Applicants acknowledge with appreciation the personal interview between the Examiner, the Examiner's supervisor and Applicants' representative on February 28, 2005. During the interview, the Examiners acknowledged that Kobayashi failed to disclose or suggest Applicants' claimed 'adjacent signals.'

Briefly recapitulating, Claim 1 is directed to an automatic frequency control method for controlling the frequency of a radio receiving signal by compensating a frequency offset of the radio receiving signal. The radio receiving signal periodically includes a plurality of adjacent known signals. The method includes estimating a frequency of a direct wave of the radio receiving signal and a center frequency of a Doppler spread of the radio receiving signal based on distortion amounts of the adjacent known signals included in the radio receiving signal. The method further includes compensating the frequency offset of the radio receiving signal based on both of the frequency of a direct wave and the center frequency of a Doppler spread. Independent Claims 3 and 11-13 are directed to alternative embodiments of Applicants' invention, each substantially reciting compensating the frequency offset of the radio receiving signal based on both of the frequency of a direct wave and the center frequency of a Doppler spread.

Atarius describes an apparatus for estimating a frequency offset by determining Doppler spread using pilot symbols, data symbols, or a combination therein.¹ However, as acknowledged in the Official Action, Atarius fails to disclose that the known signals are adjacent to the data signals, as recited in Applicants' independent claims. Kobayashi describes a TDMA burst communications scheme that includes inserting guard times between data bursts, and then multiplying the data bursts with a chirp signal.² However, contrary to the Official Action, and as acknowledged during the interview, Kobayashi fails to disclose or suggest the placement of known signals are adjacent to the data signals, as recited in Applicants' independent claims. As seen by Figure 2c of Kobayashi, there are no signals adjacent to the data bursts. Instead, the frequency of the data bursts is chirped by way of multiplication.

¹ Atarius, column 4, lines 24-58.

² Kobayashi, column 4, line 66 – column 5, line 12; Figures 2a-2c.

Takeuchi describes the measuring the delay of a TFPR signal by measuring a direct wave and reflected way so as to remove the reflected wave signal.³ However, like Atarius and Kobayashi, Takeuchi fails to disclose or suggest Applicants claimed placement of known signals are adjacent to the data signals. That is, Takeuchi merely discloses the use of TFPR signals without describing their location with respect to data signals. Furthermore, contrary to the Official Action, Takeuchi does not describe estimating any frequencies, let alone Applicants' claimed frequencies. Takeuchi only measures delay between direct and reflected signals.⁴

Thus, each of Atarius, Kobayashi, and Takeuchi fail to disclose or suggest "estimating a frequency of a direct wave of the radio receiving signal and a center frequency of a Doppler spread of the radio receiving signal based on distortion amounts of the adjacent known signals" as recited in Applicants' independent claims. Because none of the cited references describe Applicants' claimed estimating of a frequency and a Doppler center frequency based on distortion amounts of the adjacent known signals, none of the cited references to disclose or suggest "compensating the frequency offset of the radio receiving signal based on both of the frequency of a direct wave and the center frequency of a Doppler spread." Applicants have reviewed the Brardjianian and Norden references and submit these references do not cure the deficiencies of Atarius, Kobayashi, and Takeuchi. Thus, Applicants submit that independent Claims 1 and 3, and all claims depending therefrom, patentably define over the cited references.⁵ Regarding Claims 12-13, Applicants submit that Muto and Kumagai references suffer from the same deficiencies as Atarius, Kobayashi, and Takeuchi. Thus,

³ Takeuchi, column 6, lines 47-50.

⁴ Takeuchi, column 9, lines 32-41; Figure 4.

⁵ MPEP § 2142 "...the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaack, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

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Claims 12-13, and all claims depending therefrom, patentably define over the cited references.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

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